

CLAIMS

What is claimed is:

1. An audio-based tracking system comprising:

a speaker at a fixed location for transmitting an audio signal;

5 a plurality of microphones mounted upon an object for receiving said audio signal;

and

a computing device for determining at least one of a position and an orientation of
said object as a function of a delay of said audio signal received by each of said plurality of
microphones.

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2. The audio-based tracking system according to Claim 1, wherein said audio signal
comprises a sinusoidal signal.

3. The audio-based tracking system according to Claim 1, wherein said audio signal
15 comprises a marker and wherein said delay is determined as a function of receipt of said
marker by each of said plurality of microphones.

4. The audio-based tracking system according to Claim 1, wherein said delay is
determined as a function of a time delay of said audio signal received by each of said
20 plurality of microphones.

5. The audio-based tracking system according to Claim 1, wherein said determined at least one of said position and said orientation of said object controls the position of a cursor of said computing device.

5 6. The audio-based tracking system according to Claim 1, wherein said plurality of microphones communicate wirelessly with said computing device.

7. A method of tracking comprising:
transmitting a first audio signal from a first speaker;
10 receiving said first audio signal at a plurality of microphones;
determining a delay of said received first audio signal for each of said plurality of microphones; and
determining at least one of a relative position and a relative orientation of said plurality of microphones as a function of said determined delay.

15 8. The method of tracking according to Claim 7, further comprising:
transmitting said first audio signal from said first speaker during a first period of time;
transmitting said first audio signal from a second speaker during a second period of time;
20 receiving said first audio signal from said second speaker at said plurality of microphones;
determining a plurality of delays of said received first audio signal for each of said plurality of microphones during said first and second periods of time; and

determining at least one of said relative position and said relative orientation of said plurality of microphones as a function is said determined plurality of delays.

9. The method of tracking according to Claim 7, wherein said first audio signal
5 comprises a sine wave having a first frequency.

10. The method of tracking according to Claim 7, further comprising:
transmitting a second audio signal from a second speaker;
receiving said second audio signal from said second speaker at said plurality of
10 microphones;
determining a delay of said received second audio signal for each of said plurality of
microphones; and
determining at least one of said relative position and said relative orientation of said
plurality of microphones as a function of said determined delay of said received second audio
15 signal.

11. The method of tracking according to Claim 10, wherein said second audio signal
comprises a sine wave having a second frequency.

20 12. The method of tracking according to Claim 7, wherein said determined at least
one of said relative position and said relative orientation controls a cursor of a computing
device.

13. The method of tracking according to Claim 7, wherein said determined at least one of said relative position and said relative orientation controls an application executing on a computing device.

5 14. A computing system comprising:

a plurality of microphones mounted on an assembly, said assembly for mounting on an object;

a speaker for generating a wave at an above-audible frequency;

a computing device coupled to control said speaker and coupled to receive signals
10 from said plurality of microphones, said computing device for determining at least one of a relative position and a relative orientation of said assembly based on delay differences of said signals.

15 15. The computing system as described in Claim 14, wherein said computing device is a personal computer and wherein said personal computer is wirelessly coupled to said plurality of microphones.

20 16. The computing system as described in Claim 14, wherein said computing device is a game console and wherein said game console is wirelessly coupled to said plurality of microphones.

17. The computing system as described in Claim 14, wherein said plurality of microphones comprise two microphones and wherein said determined at least one of said relative position and said relative orientation is within a single spatial plane.

5 18. The computing system as described in Claim 14, wherein said plurality of microphones comprise three microphones and wherein said determined at least one of said relative position and said relative orientation is within two spatial planes.

10 19. The computing system as described in Claim 14, wherein said computing device comprises a display screen and wherein said computing device translates said determined at least one of said relative position and said relative orientation into a cursor position on said display screen.

15 20. The computing system as described in Claim 14, wherein said wave is a sine wave.